Merac Prize O: Identifying the origins of galaxy formation (No 528)

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Thursday Plenary

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Over the recent years, our understanding of both the observational methodology and the theory behind galaxy formation has matured significantly. Above all, this allows us to ask new, bold and more detailed questions. When did the first stars form and what were their properties? What drives the variation in galaxy' star formation histories? As state-of-the-art simulations are now able to broadly reproduce realistic populations of galaxies, there is a need to find new (combinations of) observables that can be used to best distinguish models and different scenarios. One exciting avenue is the extension of our observations to the most distant Universe, where we are now starting to resolve how the build-up of gas and stars in galaxies commences. Another avenue lies in the advent of extremely large statistical surveys in the present-day Universe, which allow a full multi-dimensional characterisation of the galaxy population.
In my talk I will attempt to bring these approaches of research together with several parts from my thesis work. In particular, I will present the most recent resolved view on luminous distant galaxies based on observations with ALMA, HST and MUSE. I will also discuss the origin of scatter in galaxy scaling relations in the present-day Universe, and present suggestions for a methodological connection between these two subjects with an outlook for new measurements that are anticipated in the near future.